

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: INN-SUNG LEE, ET AL.

SERIAL NO.: 10/626,758

FILED: July 21, 2003

FOR: LIQUID CRYSTAL DISPLAY AND
APPARATUS OF DRIVING LIGHT
SOURCE THEREFOR

) Examiner:
) Pham, Tammy T.
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) Art Unit: 2629
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APPEAL BRIEF

1. THE REAL PARTY IN INTEREST

The real party in interest in this appeal is Samsung Electronics Co. Ltd. Ownership by Samsung Electronics Co. Ltd. is established by an assignment document recorded for this application on October 30, 2003 on Reel 014092 and Frame 0273.

2. RELATED APPEALS AND INTERFERENCES

Applicants are unaware of any related patent applications or patents under any appeal or interference proceeding.

3. STATUS OF CLAIMS

Claims 1, 7-8 and 10-11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181) in view of Jang (U.S. Patent Application Publication No. 2001/0011980).

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Shin (U.S.

Patent No. 6,661,181) in view of Hsu (U.S. Patent No. 6,812,921).

Claims 2-6 and 12 have been objected to, but have been indicated as being allowable but for their dependence on rejected base claims.

Claims 1-12 are claims pending in the present application whiles claims 1, 7-11 are currently being appealed.

4. STATUS OF AMENDMENTS

Claims 1-12 have not been amended subsequent to filing the original application on July 21, 2003, and thus remain pending as originally filed.

5. SUMMARY OF CLAIMED SUBJECT MATTER

A concise explanation of the subject matter defined in each of the independent claims involved in the appeal is provided below.

Independent claim 1 is directed to an apparatus (900) of driving a liquid crystal display (900) of FIGS. 4 and 5. The apparatus (900) includes first and second lamp units (911 and 912, respectively); a first transformer (T1) including a primary side and a secondary side having a first terminal connected to the first lamp unit (911) and a second terminal. A second transformer (T2) including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer (T1) [at middle point A] and a second terminal connected to the second lamp unit (912). A driver (920) converts a DC signal into an AC signal and supplies the AC signal to the primary sides of the first and the second transformers (T1 and T2). A voltage sensor (930) for sensing a voltage at a middle point (A) between the second terminal of the secondary side of the first transformer (T1) and the first terminal of the secondary side of the second transformer (T2). See page 9, line 8 – page 10, line 11 with reference to FIG. 4 and page 10, line 12- page 11, line 5 with reference to FIG. 5.

Independent claim 11 is directed to a liquid crystal display as illustrated in FIGS. 1 and

2. The liquid crystal display includes a lighting unit (900) including first and second lamps (911 and 912, respectively), first and second transformers (T1 and T2, respectively) respectively connected to the first and the second lamps (911 and 912), including primary sides and secondary sides, and transmitting an AC signal for driving the first and the second lamps (911 and 912). A driver (920) supplies a signal to the primary sides of the first and the second transformers (T1 and T2). A liquid crystal panel assembly (300) [FIG. 1] having a liquid crystal (3) [FIG. 3] for displaying images by adjusting transmittance of light generated from the lighting unit (900), wherein the secondary sides of the first and the second transformers (T1 and T2) are connected to each other to form a neutral point (A). The lighting unit (900) further comprises a voltage sensor (930) for sensing a voltage of the neutral point (A). See page 9, line 8 – page 10, line 11 with reference to FIG. 4 and page 10, line 12- page 11, line 5 with reference to FIG. 5.

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner's rejection of claims 1, 7-8 and 10-11 under 35 U.S.C. §103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181) in view of Jang (U.S. Patent Application Publication No. 2001/0011980).

The Examiner's rejection of claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181) in view of Hsu (U.S. Patent No. 6,812,921).

7. ARGUMENT

A. THE EXAMINER'S REJECTION OF CLAIMS 1, 7-8 and 10-11 UNDER 35 U.S.C. §103(a) IS IMPROPER

Applicants respectfully submit that the prima facie case of obviousness as the basis for the Examiner's rejection of claims 1, 7-8 and 10-11 is rebuttable because Shin in view of Jang do not teach all of the elements of the claimed invention. Applicants also respectfully submit that there is no motivation to combine the prior art of Shin and Jang as suggested by the Examiner, and if combined, Applicants' invention would not result. Applicants further respectfully submit that the prior art of Shin and Jang is not analogous to the present invention

and thus no prima facie case of obviousness under §103(a) is established.

Regarding claim 1, the Examiner alleges that Shin teaches an apparatus of driving a liquid crystal display comprising: first and second lamp units (223a, b); a first transformer (T1) including a primary side and a secondary side having a first terminal connected to the first lamp unit (223a) and a second terminal; a second transformer (T2) including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer (T1) and a second terminal connected to the second lamp unit (223b) in column 10, lines 42-48. The Examiner admits that Shin does not teach a voltage sensor, but states that Jang teaches a voltage sensor (24) for sensing a voltage at a middle point in section [0022].

On the contrary, it is respectfully submitted that Shin fails to teach or suggest “*a second transformer including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer*” as recited in claim 1, and similarly claimed in claim 11. Instead, Shin discloses a first terminal of the secondary side of the second transformer (T2) and the second terminal of the secondary side of the first transformer (T1) both connected to a stabilization circuit (227, 235). [See FIGS. 8, 9, 18 and 21 of Shin.] In addition, if Shin is read to have secondary sides with terminals connected to each other, albeit indirectly through respective lamps 223a and 223b, Shin does not teach that the other corresponding terminals of the secondary sides connected to respective lamps, as recited in claim 1 of the present application.

Thus, independent claims 1 and 11, including claims depending therefrom, i.e., claims 2-10 and 12, define over Shin.

Further, it is respectfully submitted that use of the voltage sensor of Jang does not cure the deficiencies noted above with respect to Shin. Moreover, it is respectfully submitted that although Jang discloses the voltage sensor, Jang fails to teach or suggest the “*sensing a voltage at a middle point between the second terminal of the secondary side of the first transformer and the first terminal of the secondary side of the second transformer*” as recited in claim 1, and similarly claimed in claim 11.

In particular, neither Shin, nor Jang teach or suggest, either alone or in combination, a first transformer including a primary side and a secondary side having a first terminal

connected to the first lamp unit and a second terminal; a second transformer including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer and a second terminal connected to the second lamp unit; . . . and a voltage sensor for sensing a voltage at a middle point between the second terminal of the secondary side of the first transformer and the first terminal of the secondary side of the second transformer, as in claim 1.

In other words, Shin does not teach that the first secondary of the first transformer has a first terminal connected to the first lamp unit and the second terminal of the first secondary connected to the first terminal of the second secondary, while the second terminal of the second secondary is connected to the respective second lamp unit.

The Examiner states on page 2 of the July 20, 2006 Advisory Action that FIG. 8 of Shin “teaches that the second transformer (T2) including a primary side (left side of figure) and a secondary side (right side figure) having a first terminal (bottom of T2) connected to the second terminal (top of T1) of the secondary side (right side of figure) of the first transformer (T1).” However, it is respectfully noted that the second terminal of T2 and the first terminal of T1 are not connected to respective lamps as claimed in claims 1 and 11 of the present application.

In like manner, neither Shin, nor Jang teach or suggest, either alone or in combination, wherein the secondary sides of the first and the second transformers are connected to each other to form a neutral point, and the lighting unit further comprises a voltage sensor for sensing a voltage of the neutral point, as in independent claim 11. Thus, independent claims 1 and 11, including claims depending therefrom, i.e., claims 2-10 and 12, define over Shin in view of Jang.

Furthermore, the Examiner alleges that it would have been obvious to one skilled in the art at the time of the invention was made to combine the voltage sensor (24) of Jang with the driving apparatus of Shin in order to prevent white screen error. However, it is respectfully noted that the present invention is not concerned with white screen error as taught in Jang. Moreover, even if the driving apparatus of Shin is modified to include the voltage sensor (24) of Jang as suggested by the Examiner, the applicants’ device does not result and would not

solve the problem identified by the present invention. The combination of Shin and Jang would provide a driving apparatus that prevents white screen error.

More specifically, Jang discloses white screen error at paragraph [0013] and states the when the delay time (between the output power source voltages, specifically the first and second output power source voltages that are applied to the gate-line driving circuits, and the data signals that are respectively applied by the DC/DC converter 16 and the interface 10) is too long, the output power source voltage is applied to the gate-line driving circuit too long without the display data signals being applied to the data-line driving circuit. In that abnormal case, an over-current is applied to the gate electrode of the TFT in the LCD panel such that a surge protector or breaker of the DC/DC converter powers down all of the output power source voltages. And as a result, while a backlight is still illuminating, there exists no image data displayed on the LCD panel such that only a white color is shown to users, which is called as the white-screen error. The white screen error continues until the users turn off the main power for the desktop computer.

In particular, paragraph [0042] of Jang discloses that the solution to the above problem includes a voltage detector 24 detecting the output power source voltages from the DC/DC converter 16 and applies feedback signals to the interface controller 12. More specifically, Jang teaches that the voltage detector 24 preferably includes a transistor Q1, and first and second resistors R1 and R2. Paragraph [0041] discloses that one of the output power source voltages from the DC/DC converter 16 is connected with a gate electrode "G" of transistor "Q1" through a first resistor "R1." A source electrode "S" of the transistor Q1 is connected to a ground, and a drain electrode "D" is connected to two lines, such that a first line is connected through the second resistor "R2" with a main power source voltage, for example 3.3 VDC, that is input to the DC/DC converter 16, while a second line is connected with the interface controller 12.

Moreover, paragraph [0042] of Jang discloses that "[v]arious modifications will be applicable to the voltage detector 24, **if only the above-mentioned operation can be achieved.**" (Emphasis added.) Thus, Jang does not teach or suggest, and in fact teaches away from, the voltage detector 24 modified to sense a voltage at a connection point between

terminals from respective secondary sides of respective first and second transformers, as claimed in the instant application.

More specifically, although Jang discloses the voltage sensor (24), Jang fails to teach or suggest, and in fact teaches away from, sensing voltage at a middle point between the second terminal of the secondary side of the first transformer and the first terminal of the secondary side of the second transformer, as in independent claim 1 and similarly claimed in independent claim 11. Thus, claims 1 and 11, including claims depending therefrom, i.e., claims 2-10 and 12, define over Shin in view of Jang.

In summary and said differently, **Shin**, as shown in Fig. 8 includes a controller CT1, a transformers T1 and T2, ballast capacitors C1 and C2 connected to coils of the transformers T1 and T2, respectively, lamps 223a and 223b connected to the ballast capacitors C1 and C2, respectively, and a stabilizing circuit 227 connected remaining coils of the transformers T1 and T2, respectively. The stabilizing circuit 227 receives a feedback current through secondary coils of transformers T1 and T2 to stabilize operations of the lamps 223a and 223b.

Jang includes a voltage detector 24 having a first resistor connected between a gate terminal of a transistor Q1 and a DC/DC converter 16, a second resistor R2 connected a drain terminal of the transistor Q1 and an LCD controller 14. The voltage detector 24 senses a voltage from the DC/DC converter 16 to output it to an interface controller 12 as a feedback signal, to alarm abnormal operations of an LCD such as a white-screen error through an alarm device 26.

Accordingly, **Shin** does not disclose a feature of "a first transformer including a primary side and a secondary side having a *first terminal connected to the first lamp unit* and a second terminal; a second transformer including a primary side and a *secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer and a second terminal connected to the second lamp unit*; . . . and a voltage sensor for sensing a voltage at a middle point between the second terminal of the secondary side of the first transformer and the first terminal of the secondary side of the second transformer" as specified in claim 1. In addition, the voltage detector 24 of **Jang** has a different structure from "a voltage sensor for sensing a voltage at a middle point between the second terminal of the

secondary side of the first transformer and the first terminal of the secondary side of the second transformer” as specified in claims 1 and 11. Furthermore, the voltage detector 24 of **Jang** senses a driving voltage from the DC/DC converter 16, to alarm image quality errors based on the driving voltage, but the voltage sensor of the present invention is for controlling shutdown of an inverter. Thereby, since fields of invention are different from the voltage detector 24 of the **Jang** and the voltage sensor of the present invention, it is difficult to apply the voltage detector 24 of the **Jang** to the present invention.

The Applicants also respectfully submit that no prima facie case of obviousness under 35 U.S.C. §103(a) is established with regard to the rejected claims 1, 7-8 and 10-11 because the prior art referenced is not analogous to the present invention. For the prior art to be analogous to the present invention, the prior art must be from the same field of endeavor, or be reasonably pertinent to the particular problem with which the inventor is involved. *In re Clay*, 966 F.2d 656, 659, 23 U.S.P.Q.2d 1058, 1060-61 (Fed. Cir. 1992).

As stated above, a solution to white screen error as disclosed in Jang is not reasonably pertinent to the problem of preventing arcs and burning of a transformer, as discussed in the present application. Because the prior art white screen error and the like, and the present invention applies to preventing arcs and burning of a transformer, Applicants respectfully submit that that the prior art is not analogous to the present invention, and therefore a prima facie case for obviousness has not been established, and the rejections of claims 1, 7-8 and 10-11 should be reversed at least for this reason as well.

Accordingly, it is respectfully requested that the rejections to claims 1, 7, 8, 10 and 11 under § 103(a) be reversed.

B. THE EXAMINER'S REJECTION OF CLAIM 9 UNDER 35 U.S.C. §103(a) IS IMPROPER

It is respectfully pointed out that claim 9 depends from claim 1, which is submitted

as being allowable for defining over Shin as discussed above. Furthermore, it is respectfully submitted that use of first and second resistors connected to first and second lamp units, respectively, as allegedly taught in Hsu, does not cure the deficiencies noted above with respect to Shin.

Accordingly, it is respectfully submitted that Shin and/or Hsu, either alone or in combination, do not teach each and every limitation of claim 9, and therefore, Applicants submit that the rejection of claim 9 under 35 U.S.C. §103(a) is improper. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

C. CONCLUSION

The Examiner has failed to make a prima facie showing of obviousness in rejecting Claims 1-3 and 6-30 under 35 U.S.C. §103(a). In particular, none of the references taken alone or in any permissible combination discloses a first transformer including a primary side and a secondary side having a first terminal connected to the first lamp unit and a second terminal; a second transformer including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer and a second terminal connected to the second lamp unit, as disclosed and claimed. In addition, none of the references taken alone or in any permissible combination discloses first and second transformers respectively connected to the first and the second lamps, including primary sides and secondary sides . . . wherein the secondary sides of the first and the second transformers are connected to each other to form a neutral point, and the lighting unit further comprises a voltage sensor for sensing a voltage of the neutral point, as disclosed and claimed. For at least these reasons, it is respectfully submitted that the rejection under 35 U.S.C. §103(a) should be reversed.

Please charge any costs incurred in the filing of this Appeal Brief, along with any other associated costs, to Deposit Account No. 06-1130.

Respectfully Submitted,

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8. CLAIMS APPENDIX

1. (Original) An apparatus of driving a liquid crystal display comprising:
first and second lamp units;
a first transformer including a primary side and a secondary side having a first terminal connected to the first lamp unit and a second terminal;
a second transformer including a primary side and a secondary side having a first terminal connected to the second terminal of the secondary side of the first transformer and a second terminal connected to the second lamp unit;
a driver converting a DC signal into an AC signal and supplying the AC signal to the primary sides of the first and the second transformers; and
a voltage sensor for sensing a voltage at a middle point between the second terminal of the secondary side of the first transformer and the first terminal of the secondary side of the second transformer.
2. (Original) The apparatus of claim 1, wherein the driver is shut down when the voltage sensed by the voltage sensor is larger than a reference voltage.
3. (Original) The apparatus of claim 2, further comprising a voltage divider for dividing the voltage at the middle point and providing the divided voltage for the voltage sensor.
4. (Original) The apparatus of claim 3, wherein the voltage divider comprises first and second resistors serially connected to the middle point.
5. (Original) The apparatus of claim 2, further comprising an on/off controller supplying an off signal to the driver in response to the voltage sensed by the voltage sensor.

6. (Original) The apparatus of claim 5, further comprising a feedback controller detecting a current flowing through the first and the second lamp units and controlling the on/off controller based on the detected current.

7. (Original) The apparatus of claim 1, wherein each of the first and the second lamp units comprises a single lamp.

8. (Original) The apparatus of claim 1, wherein each of the first and the second lamp units comprises a plurality of lamps connected in series.

9. (Original) The apparatus of claim 1, further comprising first and second resistors connected to the first and the second lamp units, respectively, and commonly connected to a ground.

10. (Original) The apparatus of claim 1, wherein the primary sides of the first and the second transformers are connected in parallel to the driver.

11. (Original) A liquid crystal display comprising:

a lighting unit including first and second lamps, first and second transformers respectively connected to the first and the second lamps, including primary sides and secondary sides, and transmitting an AC signal for driving the first and the second lamps, and a driver supplying a signal to the primary sides of the first and the second transformers; and

a liquid crystal panel assembly having a liquid crystal for displaying images by adjusting transmittance of light generated from the lighting unit,

wherein the secondary sides of the first and the second transformers are connected to each other to form a neutral point, and the lighting unit further comprises a voltage sensor for sensing a voltage of the neutral point.

12. (Original) The liquid crystal display of claim 11, wherein the driver is shut down when the voltage sensed by the voltage sensor is larger than a reference voltage.

9. **EVIDENCE APPENDIX**

No evidence other than cited references by Examiner.

10. RELATED PROCEEDINGS APPENDIX

Applicants are not aware of any related proceedings for this patent application.